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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/596,027	11/21/2006	Nils Krumme	5858-07500 SR 2003/14 US	1841
35617 7590 01/16/2009 DAFFER MCDANIEL LLP P.O. BOX 684908 AUSTIN, TX 78768			EXAMINER ARTMAN, THOMAS R	
			ART UNIT 2882	PAPER NUMBER
			MAIL DATE 01/16/2009	DELIVERY MODE PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/596,027	<b>Applicant(s)</b> KRUMME, NILS	
	<b>Examiner</b> THOMAS R. ARTMAN	<b>Art Unit</b> 2882	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 08 January 2009.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 14-39 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 27-39 is/are allowed.
- 6) ☒ Claim(s) 14-23 is/are rejected.
- 7) ☒ Claim(s) 24-26 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)          | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Continued Examination Under 37 CFR 1.114***

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submissions filed on January 7<sup>th</sup> and 8<sup>th</sup>, 2009, have been entered.

### ***Claim Objections***

Claims 17 is objected to because antecedent basis is lacking for “the conductor arrangement.” The term “arrangement” should be deleted.

Appropriate correction is required.

Claims 19 and 20 are objected to because of antecedent basis issues. It appears that each claim should depend from claim 16, rather than claim 14.

Appropriate correction is required.

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***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 14, 15, 17, 18, 20 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Steigerwald (US 5,608,771).

Regarding claims 14 and 20, Steigerwald discloses a CT system (Figs.2, 4, 6 and 7), including:

- a) a rotating part 22, 42, 70 for accommodating an x-ray tube 62 and a detector 72,
- b) a stationary part 24, 44 for rotatably supporting the rotating part, including at least one DC-AC converter 56 for generating an alternating current at a first frequency close to a resonant frequency,
- c) a conductor 28 mounted to the stationary part 24 and supplied with alternating current from the at least one DC-AC converter, where the conductor extends in a straight line in a rotating first plane and an arcuate line in another plane perpendicular to the first plane along a rotational path in which the rotating part rotates (Figs.2 and 4), and
- d) an inductive coupler 30 mounted to the rotating part 42 for movement along the straight, arcuate line of the conductor for coupling electrical energy out of the conductor as the rotating part rotates (see at least Abstract).

Steigerwald does not specifically disclose that the conductor is mounted to the stationary part via support rods.

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However, the skilled artisan appreciates the fact that the conductor 28 is not floating in space but is fixed to the stationary part in appropriate manners known to the skilled artisan for maintaining proper alignment with the rotating part.

It would have been obvious to one of ordinary skill in the art at the time the invention was made for Steigerwald to support the conductor arrangement by support rods as a known method of fixing a conductor to a stationary portion of a rotating gantry in order to maintain alignment, absent any showing of criticality or unexpected results.

With respect to claim 15, Steigerwald further discloses two parallel conductors 28 through which electric currents flow such that the sum of the currents through all conductors is zero at every place along the conductors (col.2, lines 55-58).

With respect to claim 17, Steigerwald further discloses a plurality of couplers 30 are provided, at least one coupler being engaged with the conductor arrangement at any instant of time.

With respect to claim 18, Steigerwald further discloses that at least one coupler 30 has magnetically soft material 22, 42 for concentrating magnetic flux.

With respect to claim 21, Steigerwald further discloses at least one capacitor  $C_s$  connected in series with the conductor (Fig.6).

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Claims 16, 19, 20, 22 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Steigerwald, as applied to claim 14 above, in view of Harada (US 6,674,836 B2).

With respect to claims 16, 19, 20 and 23, Steigerwald does not specifically disclose that the conductor is made up of a plurality of segments, where each segment is supplied with a separate DC-AC converter, such that a DC-AC converter is switched off in case of non-engagement with the inductive coupler.

Harada teaches the practice of dividing a conductor arrangement 16, 17 into multiple segments along a circumferential direction and fed by respective DC-AC converters 15 (Figs.1, 3-8 and 10) as an advantage over a single continuous segment 116 fed by one inverter (Fig.11). In this manner, a defective portion can be shut down while allowing the CT system to continue operation.

It would have been obvious to one of ordinary skill in the art at the time the invention was made for Steigerwald to have the conductor split into a plurality of circumferentially arranged segments, each powered by a respective DC-AC converter, as taught by Harada, in order to improve the reliability of the device, as suggested by Harada.

Further regarding claim 20, Steigerwald discloses supplying current to the conductor at a resonant frequency, and Harada further teaches that DC-AC converters 15 supply current to a respective segment of the conductor arrangement at or near a resonant frequency.

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With respect to claim 22, Steigerwald does not disclose the use of a parallel capacitance.

Harada specifically teaches the practice of providing a capacitor 24 or 31 either in series or in parallel with a conductor 16 or an inductive coupler 18 (Figs.3 and 5-7). Harada considers these arrangements as functionally equivalent methods of providing appropriate resonance characteristics for increasing the operating frequency, and thus the efficiency, of the coupling arrangement (col.6, lines 49-64; col.7, lines 15-18 and 32-44).

It would have been obvious to one of ordinary skill in the art at the time the invention was made for Steigerwald to place a capacitor in parallel with the conductor, as taught by Harada, as a functionally equivalent means for improving operational efficiency, as taught by Harada.

#### ***Allowable Subject Matter***

Claims 24-26 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter: the prior art of record additionally teaches the practice of such inductive power coupling slip rings having the ability to supply the high voltage circuitry of the x-ray tube as well as to supply the lower voltage supplies for detector electronics, etc. (Dobbs, US 2006/0022785 A1, Figs.4A and 4B; paragraphs 41-44).

However, the prior art of record neither teaches nor reasonably suggests the additional limitations of having at least one inverter deliver current at a second frequency and further

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having a frequency selective coupler for passing a tapped-off signal or energy having the second frequency to at least one other consumer, as required by the combination as claimed in **claim 24**.

The prior art of record neither teaches nor reasonably suggests the additional limitations of having at least one inverter that supplies AC current at a variable pulse-width repetition rate, and further having a filter unit on the rotating part to select frequency components with whole-number multiples of the first frequency, and to supply the current with the selected frequency to at least one other consumer, as required by the combination as claimed in **claim 25**.

The prior art of record neither teaches nor reasonably suggests the additional limitation of the inverter having a modulated output frequency, where the frequency sweep is chosen to minimize amplitude fluctuations in the output current, where the modulation frequency is at least 100 Hz, as required by the combination as claimed in **claim 26**.

Claims 27-39 are allowed.

The following is a statement of reasons for the indication of allowable subject matter: the examiner agrees with Applicants' arguments, see pp.8-9, that the prior art of record neither teaches nor reasonably suggests a CT system with an inductive power coupling slip ring as claimed, where a conductor is mounted to the rotating part, and further where an inductive coupler that is mounted to the stationary part and partially surrounds the conductor along the length of the conductor as the conductor moves with the rotation of the rotating part, as required by the combination as claimed in **claim 27**. Claims 28-39 are allowed due to their dependency.



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***Conclusion***

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. US Patents to Katcha (US 7,054,411 B2 and US 7,197,133 B1) teach inductive power coupling slip rings similar to those of Steigerwald.

Collier (US 5,023,768) teaches a slip-ring based CT x-ray tube power supply.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to THOMAS R. ARTMAN whose telephone number is (571)272-2485. The examiner can normally be reached on 9am - 5:30pm Monday - Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ed Glick can be reached on (571) 272-2490. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Thomas R Artman/  
Examiner, Art Unit 2882

Thomas R Artman  
Examiner  
Art Unit 2882